

**PROGRAMME:** 4-YEAR B. ED TECHNOLOGY EDUCATION  
**COURSE:** **MECHANICAL MATERIALS:**  
**CODE:** **DTE 113**  
**CREDIT:** 2  
**SEMESTER:** ONE  
**LEVEL:** 100

**COURSE DESCRIPTION**

**Objective:** The course is to create an understanding of physical and working properties of engineering materials. It is also to create an awareness of how the properties influence the selection of materials for the manufacture of projects.

**AREAS OF COVERAGE**

| WEEK | TOPIC                        | CONTENT / NOTES   | ASSIGNMENT / DATE OF SUBMISSION  |
|------|------------------------------|---|--|
| 1    | General properties of metals | Revise relevant properties such as malleability, brittleness.   |  |
| 2    | Iron ores                    | Discussing ores such as magnetite and haematite.<br>Explaining production of iron.  | Read further and make notes.   |
| 2    | Ferrous metals               | Properties of ferrous metals:   | Read and make notes.   |
| 3,4  | Plain carbon steels          | Describing the following plain carbon steels; mild steel, medium carbon, high carbon.   |  |
| 5,6  | Alloyed steels               | Describing alloyed steels; High speed steel, substitute high speed steel, alloy / carbon tool steel, stainless steel, etc.  | Differentiate between plain steels and alloyed steels. Cite two examples each of the two categories of steel and describe their characteristics and uses.<br>Submission: week 10 |
| 7    | Cast iron                    | Alloying elements of cast iron.<br>Uses of cast iron.   |  |
| 8,9  | Non-ferrous metals           | Describing the properties of the following non-ferrous materials: Aluminium, Zinc, Tin, Copper, Brass<br><br>Discussing the nature, properties and uses of aluminium and copper alloys. | Account for the importance of non-ferrous metals in metalwork citing three examples.<br>Submission: week 10  |

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| 10,11  | Non-metals<br><br>Plastics<br><br>Ceramics | Discussing non-metals, differentiating between metal and non metals.<br><br>Discussing the two main types of plastics and citing examples.<br><br>Defining ceramics and citing examples. | Differentiate between the two main types of plastics.<br><br>Plastics are more versatile than metals: support or refute this assertion with ten reasons.<br><br>Submission: week 13<br><br><b><i>Class quiz</i></b> |
| 12     | Fastening / locking devices                | Describing the various types of fasteners and techniques of fastening and locking.   | Describe two named fasteners stating when each is used.   |
| 13, 14 | Types and uses of screw threads            | Describing the types of threads  |   |
| 15,16  | End of semester exam                       |  |   |

***METHODOLOGY:*** The course is undertaken through discussion in class and sharing of practical experiences. Class quizzes and take-home assignments take 40% of the total coursework. End of semester examination carries 60%. Failure to take part in assignments or class exercises renders a student ineligible to take the end of semester examination.

### **References**

Love, G. (1980). The Theory & Practice of Metalwork, London & Edinburgh, Longman.

Sackey, J.K.N. & Amoakohene, S.K. (1996). The Motivate Series – Metalwork Technology, London & Basingstoke, Macmillan.

Timings, R.L. (1991). Mechanical Engineering Craft Theory & Related Subjects: Vol. 1&2, Singapore, Longman-Singapore.

Willacy, M.D. (1989). Craft & Design in Metalwork, London, Hutchinson.